LTF "wrxrev"

WRX16 REVISITED

by Fred Nachbaur

This article adds a couple more options to the "mini operating system" described for "WRX16" high-res, published in SWN #4:2. The first routines upload or download the video data between your static RAM and a dimensioned string variable. This allows you to save your screens to tape along with the rest of your program, and reinstall after loading. The other routine is a modification of the COPY command in "SRAM HI*RES EXTENDED BASIC," co-authored with Gregory C. Harder. It allows you to dump your picture to the TS2040 or similar printer. Though our mini operating system won't be anything close to SRAM HI*RES, it will at least give you something to experiment with.

Finally, we'll put it all to work in an actual application; a rewrite of the MANDELPLOT listing of SWN #3:5. This demonstrates that you can upgrade existing graphics programs to high resolution, even with only our rudimentary operating system. Now, even it you have just 16K (plus of course the all-important 8K static RAM), you can turn out fractal pictures that are the envy of much larger machines. TS2068ers - don't feel left out. The program will run on your machine with very little modification.

Start with the decimal loader, and the 1 REM and 2 REM lines of the WRX16 article. Fill these REMs as described. Now add a 3 REM line containing 26 bytes, and a 4 REM containing 84 bytes. Enter the values in TABLE 1 and TABLE 2 to fill these new REMs. The result will be three additional commands:

```
USR 16758 - Transfer hi-res screen into P$.
USR 16765 - Transfer P$ into HR display file.
USR 16790 - COPY HR display to TS2040.
```

The screen variable may be named anything you like (A$ through Z$), but MUST be single-dimensioned at 6144 bytes [e.g. DIM P$(6144)], and MUST be the first variable defined.

Another use for the UP/DOWNLOAD option is to export your screen data to other programs, using Z-XLR8 or other mass-storage allowing array save/load. For example, you could export P$ to Peter McMullin's "big printer" version of Sinc-Artist, to dump your hi-res images to "big" printers via any of the popular interfaces. Cost is $16.95. A "tiny" COPY, small banner, or large banner can thereby be produced of ANY WRX16-based screen. Contact Peter at 2340 Queen St. East, Toronto Ontario M4E 1G9 Canada.

Listing 1 demonstrates how you can use this, and the artwork with the article shows off some actual results from the program. RUN the program to start. Enter the parameters to locate your plane of interest, and the maximum number of iterations that the program should perform. You are then prompted for "Band Width." This is how many counts are to be taken for each band (white or black). Normally you will choose 1 (even numbers=white, odd numbers=black). If the result is too "busy," try using 2 (0&1 = white, 2&3 = black, 4&5 = white, etc.) or even higher. The run that resulted in the picture above was actually three separate runs, with the following parameters:

REAL= .26911083, .26926312, .26941541
IMAG= .0043502083
SIDE= .000152289
ITERATIONS= 120
BANDWIDTH= 2

This region is a "close-up" of a portion of the "Gemini 10" picture displayed in #3:5.

To use this with the TS2068, pretty much all you have to do is omit FAST and SLOW commands, and all POKEs and USR calls. You can work up your own REVERSE routine, or simply omit references to this option. Similarly, the UPLOAD/DOWNLOAD routines won't be necessary, since you can save screens to tape directly, using CODE or SCREEN$. Also omit lines 770 through 870, 125 and 135. Replace line 275 with 275 IF C/2<>INT(C/2) THEN PLOT M,N+32. Choose white INK, black PAPER, or vice versa, or whatever you prefer.

Oliger video users: contact me about a version of this program available through the JOBASIC EXCHANGE.

FIGURE 1: TS2040 printout, reversed video

FIGURE 2: C.Itoh 8510 printout, via "Big Printer" SincArtist.

LOAD "TABLES"

TABLE 1: UP/DOWNLOAD ROUTINES

START=16758 BYTES=26

```
205:130: 65:235:237:176:201:205:
130: 65: 24:248: 42: 16: 64: 17:
  6:  0: 25: 17:  0: 32:  1:  0:
 24:201:
```

TABLE 2: TS2040 COPY ROUTINE

START=16790 BYTES=84

```
205: 35: 15: 58:181: 64: 95: 33:
  0: 32:175:211:251:205: 70: 15:
210:133:  8:219:251: 23: 48:251:
 22: 32:  6:  8: 78:229:213: 62:
 32:146: 95: 22:  0: 33:133: 64:
 25:203:126:209:225:121: 40:  1:
 47: 79:219:251: 31: 48:251:121:
230:128:211:251:203: 17: 16:242:
 35: 21: 32:214:219:251: 31: 48:
251: 29: 32:190: 62:  4:211:251:
 28:195: 43: 15:
```

LISTING 1: HIGH-RES MANDELBROT

```
   5 REM HR-MANDELBROT
  20 GOTO 500
 100 FAST
 102 IF M<192 AND N<192 THEN GOT
O 120
 105 PRINT AT 10,0;"ALL DONE.",,
,,
 110 GOTO MNU+10
 120 FOR M=M TO 191
 125 POKE YP,M
 130 FOR N=N TO 191
 135 POKE XP,N+32
 140 IF INKEY$<>"" THEN GOTO MNU
 150 LET X=N*G+A
 160 LET Y=M*G+B
 170 LET K=0
 180 LET J=K
 190 LET C=K
 200 LET R=K*K-J*J+X
 210 LET J=2*K*J+Y
 220 LET K=R
 230 LET Z=K*K+J*J
 240 IF Z>4 THEN GOTO 270
 250 LET C=C+1
 260 IF C<L THEN GOTO 200
 270 LET C=INT (C/W)
 275 IF C/2<>INT (C/2) THEN RAND
 USR PLT
 280 NEXT N
 290 LET N=0
 300 NEXT M
 310 GOTO 100
 500 DIM P$(6144)
 505 CLS
 510 SLOW
 520 PRINT " INPUT CO-ORDS OF SW
 CORNER OF   PROPOSED MANDELBROT
 PLANE:",,,"A-CORNER (REAL PART)
=";
 530 INPUT A
 540 PRINT A;AT 5,0;"B-CORNER (I
MAG PART)=";
 550 INPUT B
 560 PRINT B;AT 7,0;"LENGTH OF E
ACH SIDE ;";
```

(or "MANDEL2")

LOAD "MANDEL1"

NOT "MANDEL3"

CLLISTable using daisy-wheel.

HINT: LIST 5, THEN COPY.

LIST 231, COPY

LPRINT "ACH SIDE=";"

etc

```
 570 INPUT S
 585 LET G=S/192
 610 LET X=0
 620 LET Y=X
 630 LET K=X
 640 LET J=X
 650 FOR M=X TO X
 660 FOR N=X TO X
 690 PRINT S;AT 10,0;"ITERATION
LIMIT=";
 710 INPUT L
 720 PRINT L;AT 12,0;"BAND WIDTH
=";
 730 INPUT W
 740 PRINT W,,,,"OK?"
 750 INPUT Y$
 760 IF Y$<>"Y" THEN RUN
 770 LET CLS=16648
 780 LET  HR=16628
 790 LET NML=16633
 800 LET RVS=16669
 810 LET PLT=16681
 830 LET  YP=16439
 840 LET  XP=16438
 850 LET ULD=16758
 860 LET DLD=16765
 870 LET CPY=16790
 880 LET MNU= 1000
 900 POKE 16565,192
 910 POKE 16670,137
 920 POKE 16673,24
 930 RAND USR CLS
 940 CLS
 950 GOTO 100
1000 CLS
1010 RAND USR NML
1015 SLOW
1020 PRINT AT 0,0;"   main menu'
",,,,"1: START A NEW RUN ","2: S
AVE CURRENT PROGRAM STATE","3: R
ESUME CURRENT RUN ","4: DISPLAY/
COPY PICTURE","5: PROGRESS REPOR
T","6: STOP "
1030 LET Z$=INKEY$
```

```
1040 IF Z$="" THEN GOTO 1030
1050 IF Z$="1" THEN RUN
1060 IF Z$="2" THEN GOTO 2000
1070 IF Z$="3" THEN GOTO 100
1080 IF Z$="4" THEN GOTO 3000
1090 IF Z$="5" THEN PRINT ,,"ROW
: ";M,"COL:";N,36863-192*M-N;" T
O GO"
1100 IF Z$="6" THEN STOP
1110 GOTO 1030
2000 RAND USR ULD
2010 CLS
2020 PRINT " INPUT SAVE NAME:"
2030 INPUT N$
2040 SAVE N$
2050 RAND USR DLD
2060 GOTO MNU
3000 CLS
3010 POKE 16418,0
3020 PRINT AT 23,0;"R= REVERSE,
Z= COPY , Y= RETURN "
3030 POKE 16418,2
3040 RAND USR HR
3050 LET Z$=INKEY$
3060 IF Z$="R" THEN RAND USR RVS
3070 IF Z$="Z" THEN RAND USR CPY
3080 IF Z$="Y" THEN GOTO MNU
3090 GOTO 3050
4000 STOP
```

FIG. 1

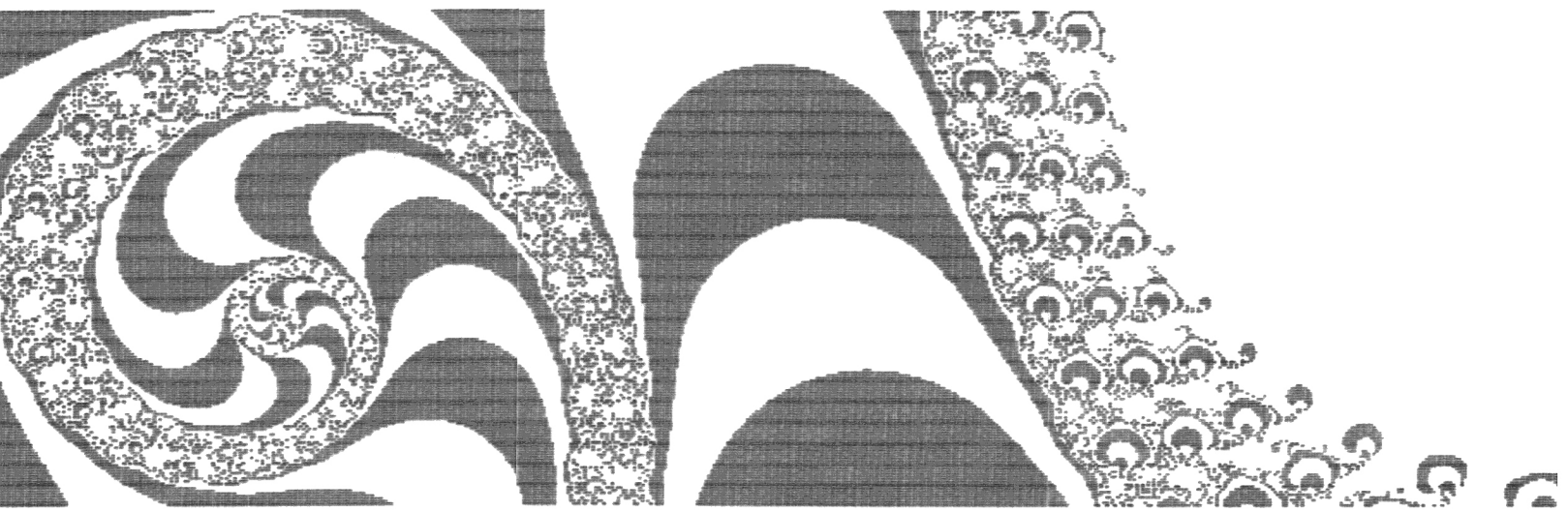

FIG. 2